

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 5-8 are being added.

This amendment adds claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-8 are now pending in this application, of which claims 3-4 are withdrawn.

New claims 5-8

New dependent claims 5-8 have been added. Support for new claim 5 can be found at least in paragraph [38] of the specification. Support for new claims 6 and 8 can be found at least in paragraph [39] of the specification. Support for new claim 7 can be found at least in paragraph [62] of the specification.

Rejection under 35 U.S.C. § 103

Claims 1-2 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,213,658 to Ishida (hereafter “Ishida”) in view of U.S. Patent No. 6,228,563 to Starov et al. (hereafter “Starov”). Applicant respectfully traverses this rejection for at least the following reasons.

Claim 1 is directed to a plasma etching apparatus. The apparatus includes a sensor for measuring a position of an upper surface of a focus ring of the apparatus, and a controller for adjusting the position of the upper surface of the focus ring by driving a drive mechanism of the apparatus on the basis of a result of a measurement by the sensor. The apparatus overcomes problems where the focus ring is corroded by etching gas and the height of the focus ring changes. Neither Ishida, or Starov, either alone or in combination, suggest the present invention of claim 1, which includes a sensor for measuring an upper surface of a

focus ring, and a controller for adjusting the upper surface of the focus based on a result of the measurement.

Ishida discloses a plasma processing apparatus including a focus ring 2A, and further discloses that the amount of electric current flowing through electromagnets 11 is set so that the height of the focus ring 2A is suitable for obtaining the best uniformity when the uppermost layer of the laminated film on the substrate 1 is etched (col. 3, lines 30-35).

As correctly recognized in the Office Action, however, Ishida fails to teach a sensor for measuring a position of an upper surface of the Ishida focus ring.

Starov fails to cure the deficiencies of Ishida. Starov discloses that the controller 510 relies on feedback from various sensors and transducers for sensing the positions of movable mechanical assemblies such as the reaction chamber door 36 and the substrate platen 34 (col. 21, lines 59-63), and that the motion controller manipulates the positioning of the substrate 10 (col. 22, lines 18-19). Thus, Starov discloses only a sensor or transducer for sensing the position of the platen holding the substrate, and controlling the position of the substrate. Nowhere does Starov disclose a sensor that measures a position of an upper surface of a focus ring, or controlling the position of an upper surface of a focus ring based on such a position measurement. Thus, even if Ishida and Starov were combined, the resultant apparatus would not meet the limitations of claim 1.

Moreover, neither of Ishida or Starov are directed to solving problems with corrosion of a focus ring which alters the height of the upper surface of the focus ring, and thus there is no suggestion in either one of these references that the height of the upper surface of the focus ring should be measured and then controlled. While Ishida discloses setting the height of a focus ring, Ishida does not disclose that the upper surface of the focus ring should be set. This is significant because although the height of some portions of the Ishida focus ring may remain constant, the upper surface thereof may change due to corrosion. Ishida discloses nothing about compensating for such a change, and does not suggest measuring the height of the upper surface of a focus ring.

Further, there is no motivation for combining Ishida or Starov as suggested in the Office Action. Starov discloses only sensing the position of a platen holding a substrate, and controlling the position of a substrate. Starov provides no motivation to modify Ishida to sense the position of an upper surface of a focus ring, or to control the position of an upper surface of the focus ring based on such a position measurement.

Dependent claim 2, and new dependent claims 5-8 ultimately depend from independent claim 1 and are patentable for at least the same reasons, as well as for further patentable features recited therein. For example, claim 2 recites “wherein said sensor can measure the position of the upper surface of said focus ring at a plurality of points of said focus ring, and said drive mechanism can change the position of the upper surface of said focus ring at a plurality of points of said focus ring”, features not shown in either Ishida or Starov. The Office Action assertion that the limitations in claim 2 would have been obvious in order to enhance the measurement and positioning of the focus ring, amounts to hindsight reconstruction of applicant’s invention using the present application as a guide.

For at least the reasons given above, applicant respectfully requests that the rejection of the claims under 35 U.S.C. § 103 be withdrawn.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date October 30, 2003

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